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Science | Sciences

Canadian Science Advisory Secretariat
Science Response 2013/005

Maritimes Region

MARITIMES RESEARCH VESSEL SURVEY TRENDS ON GEORGES BANK

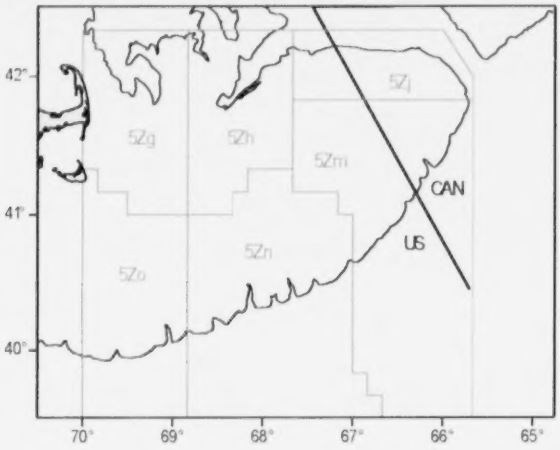

Figure 1. Northwest Atlantic Fisheries Organization (NAFO) Unit Areas for Georges Bank.

Context

DFO has conducted winter research vessel (RV) surveys in the Maritimes Region, Northwest Atlantic Fisheries Organization (NAFO) Area 5Z (Georges Bank; Figure 1) using a standardized protocol since 1987. Results of these surveys provide information on trends in abundance for groundfish species in the Maritimes Region. While these data reflect trends in biomass and abundance and are a critical part of science-based stock assessments, a full assessment, including other sources of data, would be required to evaluate the impacts of management measures on population status. Fisheries and Aquaculture Management (FAM) requested a review of the DFO winter survey information on the following species in 5Z1-5Z4: cod, haddock, pollock, sea raven, ocean pout, yellowtail flounder, Atlantic wolffish, monkfish, smooth skate, thorny skate, barndoor skate, winter skate, little skate, and longhorn sculpin. The survey information will be used by FAM as background for discussions with various industry stakeholders on recommendations for management measures, and to determine which stocks should be reviewed in more detail in 2013/14.

This Science Response Report results from the Science Special Response Process of October 24, 2012, on the Review of Maritimes Research Vessel Survey Trends. Additional publications from this process will be posted as they become available on the Fisheries and Oceans Canada Science Advisory Schedule at www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm.

Background

The Georges Bank (5Z) winter research vessel (RV) survey has been conducted annually using a standard stratification since 1987. The survey follows a stratified random sampling design, and includes sampling of fish and invertebrates using a bottom otter trawl. These surveys are the primary data source for monitoring trends in species distribution, abundance, and biological condition on Georges Bank (for details see Stone and Gross, 2012).

The bottom trawl surveys were designed to provide abundance trends for fish and invertebrates between depths of about 30 m and 200 m. Survey indices are expected to be proportional to abundance for most species. The distribution of some species, such as Atlantic wolffish and monkfish, are not fully covered by the survey. Abundance trends for these species may only provide an indication of the direction of change over time.

Survey strata boundaries are shown in Figure 2 for the 5Z area. Sampling was conducted in strata 5Z1-5Z4, 5Z8 and 5Z9 in 2012. Catch distribution plots for the area sampled are provided for the suite of species requested. Biomass index trends are shown for 5Z1-5Z4. Comparisons of 2011 and 2012 length frequencies from the survey catch to the long-term mean (1987-2010) are also included for selected stocks.

Figure 2. Georges Bank (5Z) winter Research Vessel survey strata.

Analysis

The time-series of survey biomass indices (not total population biomass) are compared to averages for a series of time periods to provide historical context for biomass levels. The time

periods used are a short-term 5 year average (2007-2011) and the long-term survey average (1987-2011). Length composition/abundance plots are not included for some species due to low numbers caught in the survey. Information on the calculation of these indices is contained in Stone and Gross (2012).

Atlantic Cod

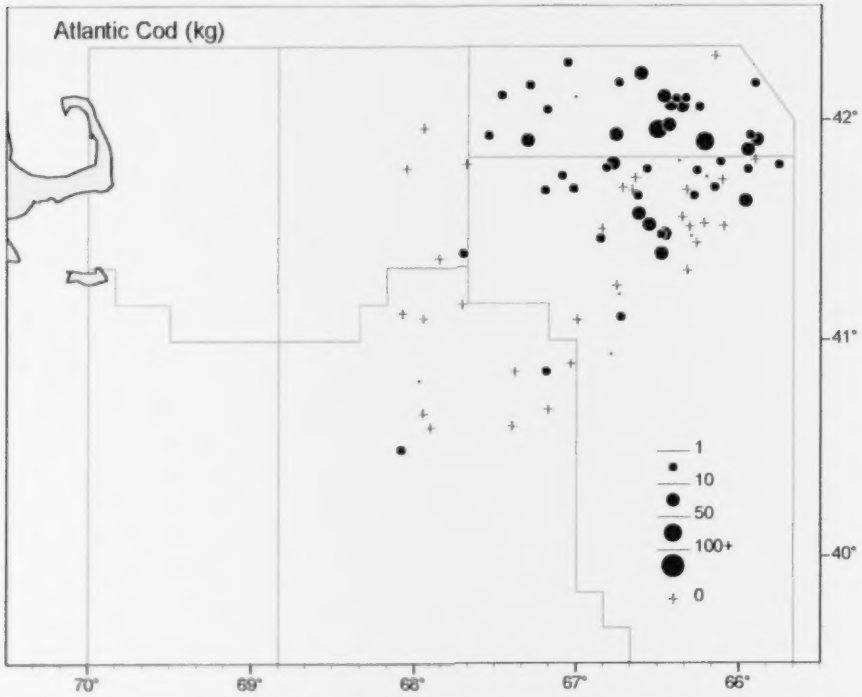

Figure 3a. Distribution and magnitude (weight/tow) of cod catches during the 2012 winter RV survey.

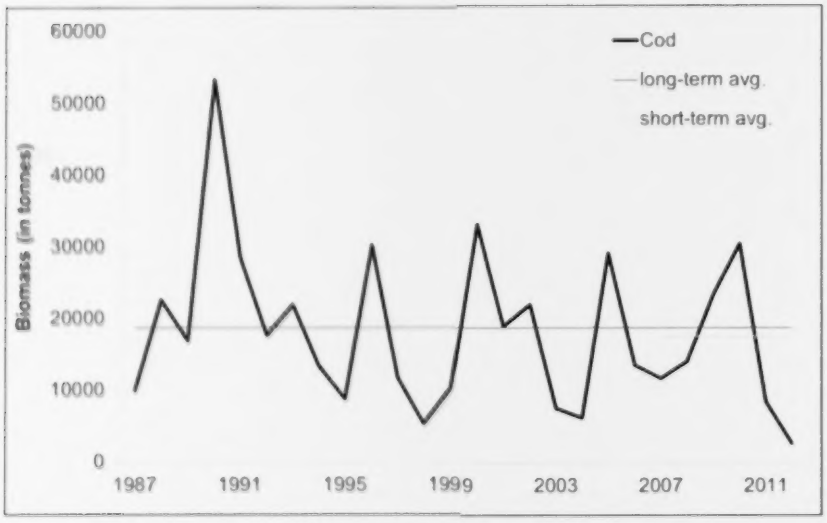

Figure 3b. Biomass indices for cod in strata 5Z1-5Z4 from the winter RV survey.

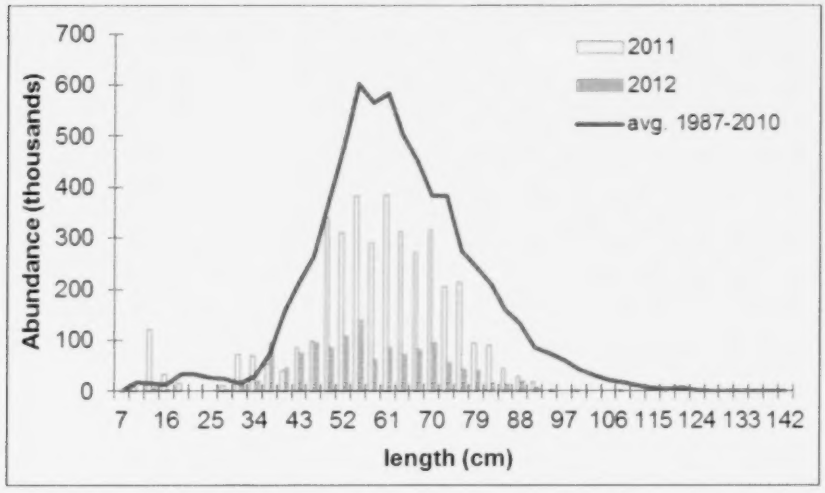

Figure 3c. Length composition for cod in strata 5Z1-5Z4 from the winter RV survey.

Haddock

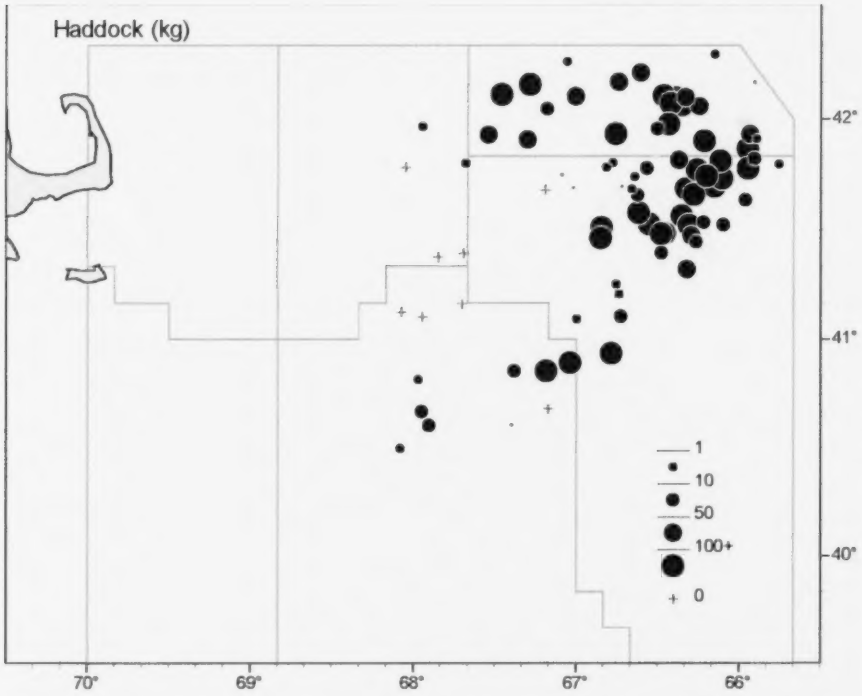

Figure 4a. Distribution and magnitude (weight/tow) of haddock catches during the 2012 winter RV survey.

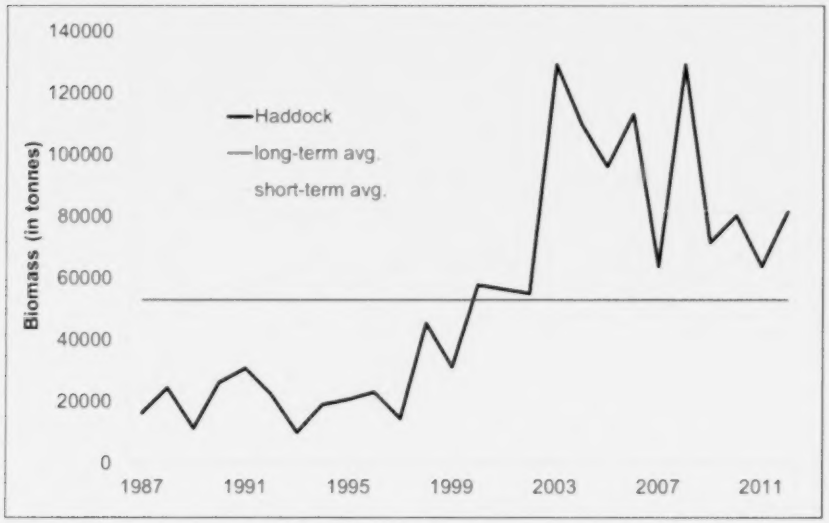

Figure 4b. Biomass indices for haddock in strata 5Z1-5Z4 from the winter RV survey.

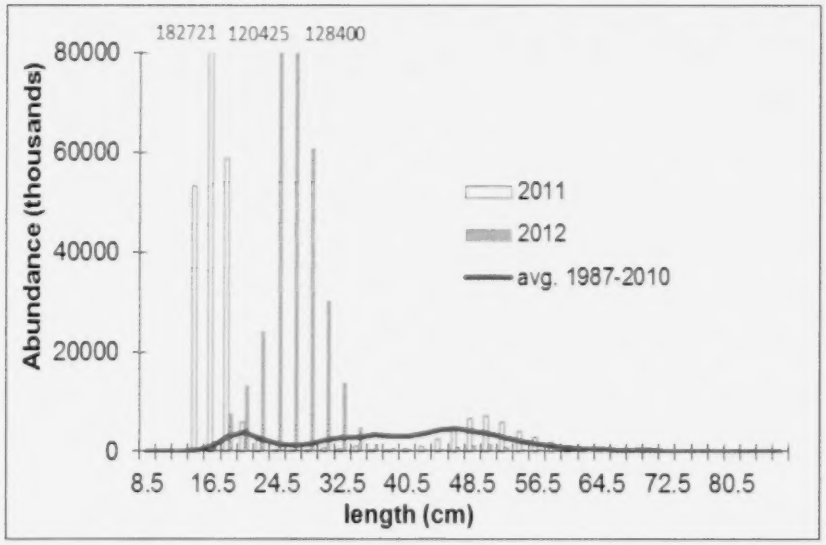

Figure 4c. Length composition for haddock in strata 5Z1-5Z4 from the winter RV survey.

Pollock

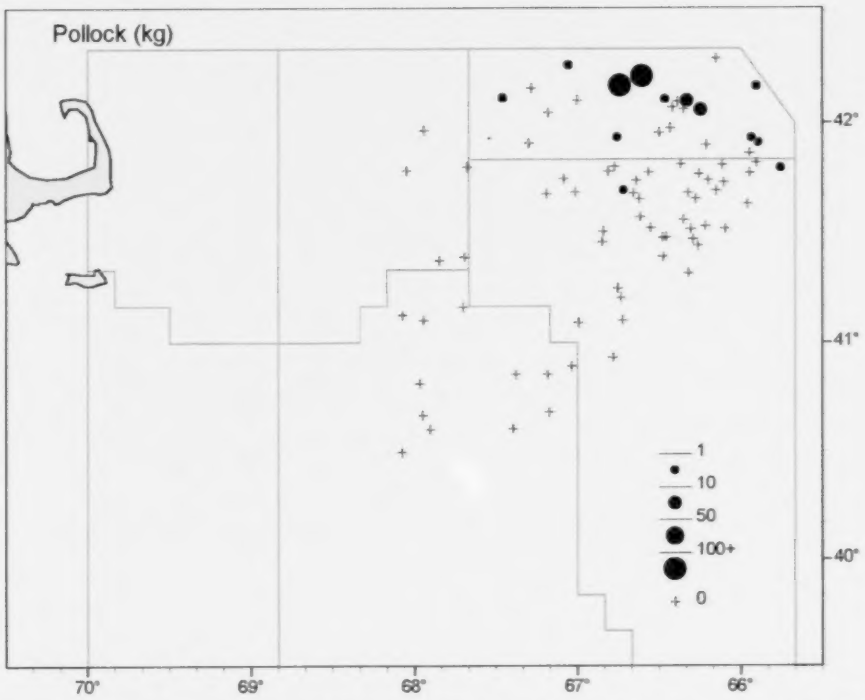

Figure 5a. Distribution and magnitude (weight/tow) of pollock catches during the 2012 winter RV survey.

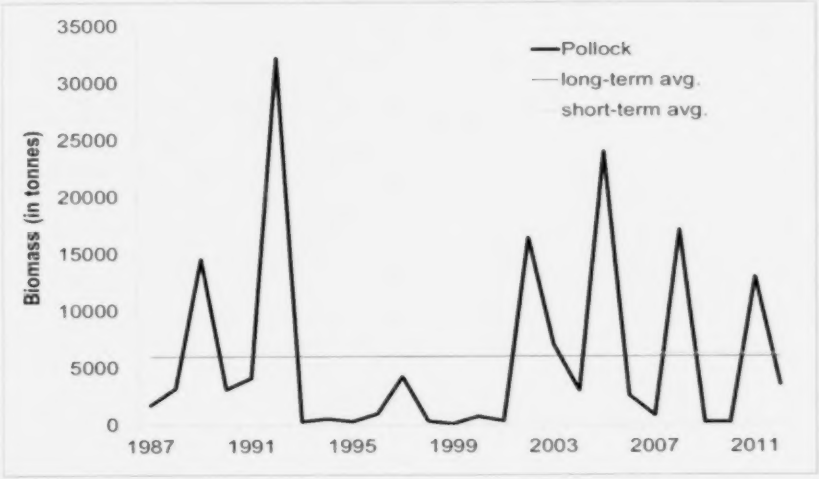

Figure 5b. Biomass indices for pollock in the portion of the Western component covered in strata 5Z1-5Z4 from the winter RV survey.

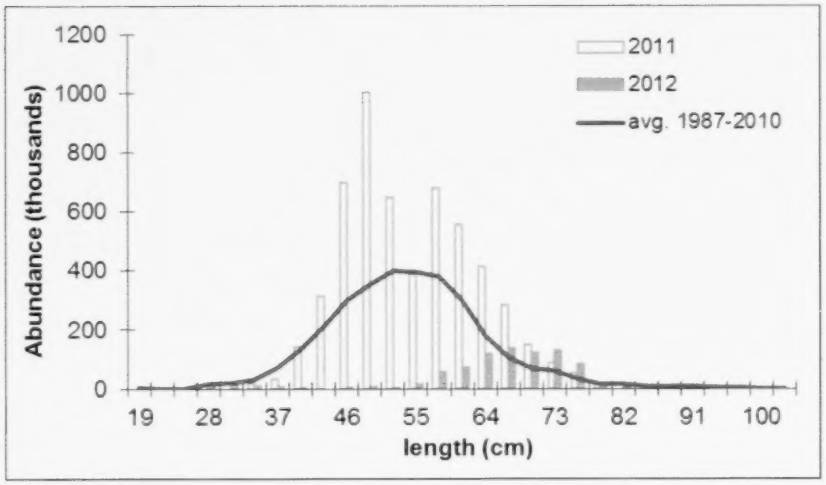

Figure 5c. Length composition for pollock in the portion of the Western component covered in strata 5Z1-5Z4 from the winter RV survey.

Sea Raven

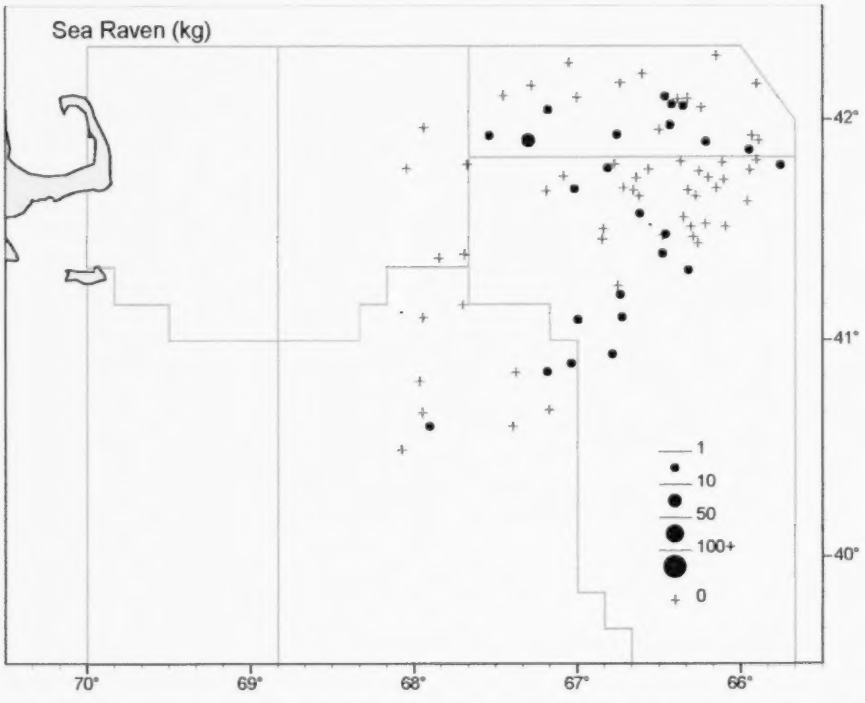

Figure 6a. Distribution and magnitude (weight/tow) of sea raven catches in the 2012 winter RV survey.

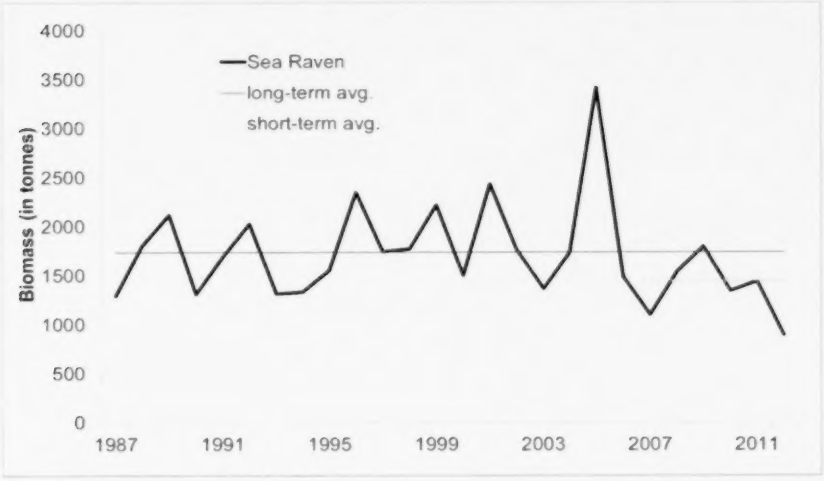

Figure 6b. Biomass indices for sea raven in strata 5Z1-5Z4 from the winter RV survey.

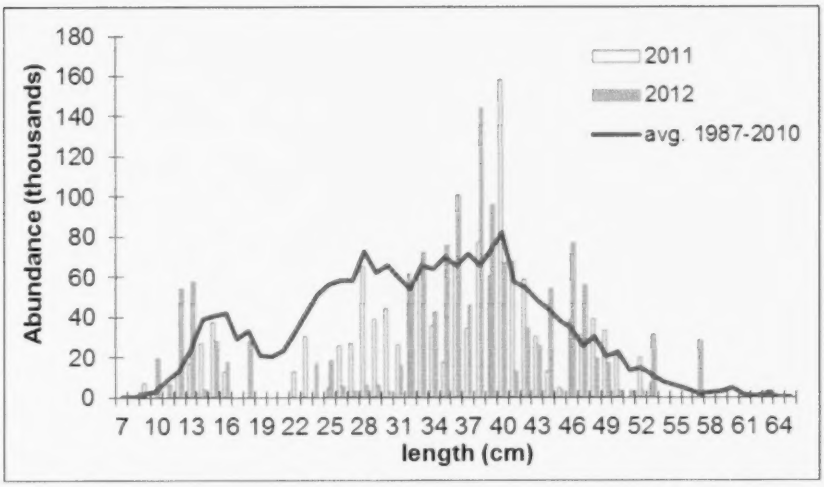

Figure 6c. Length composition for sea raven in strata 5Z1-5Z4 from the winter RV survey.

Ocean pout

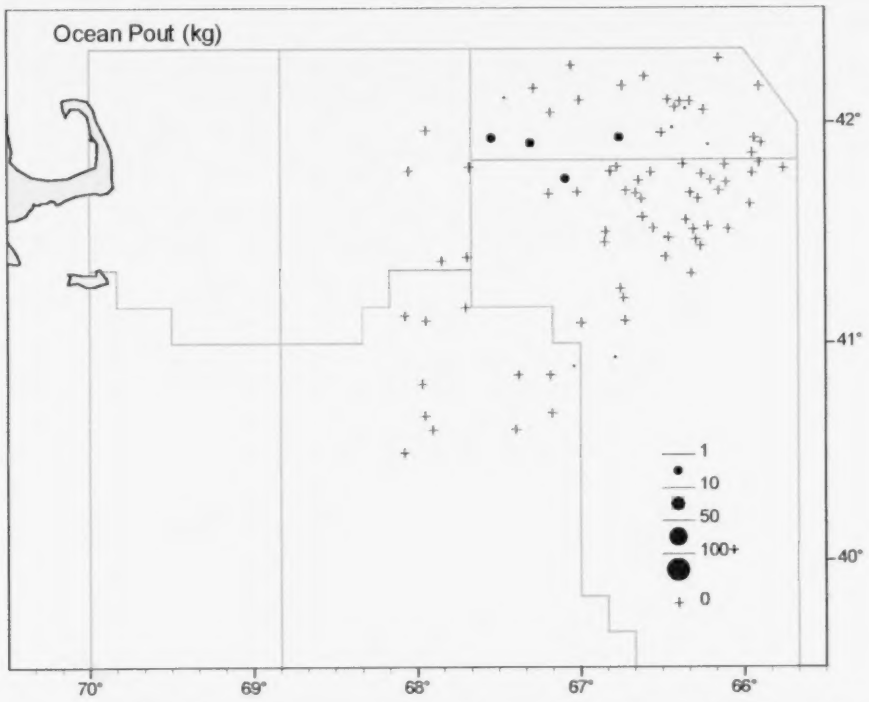

Figure 7a. Distribution and magnitude (weight/tow) of ocean pout catches during the 2012 winter RV survey.

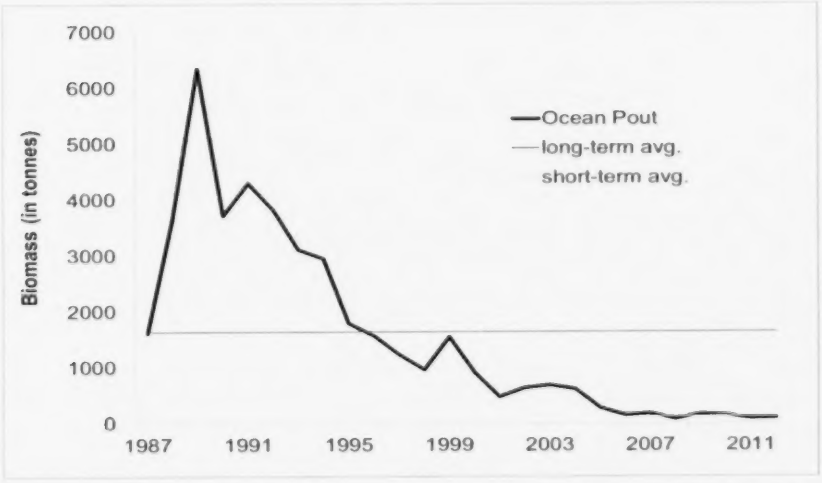

Figure 7b. Biomass indices for ocean pout in strata 5Z1-5Z4 from the winter RV survey.

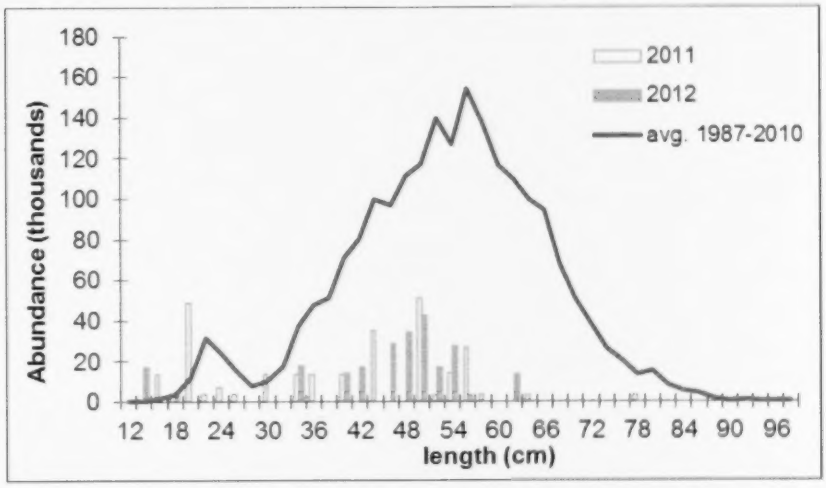

Figure 7c. Length composition for ocean pout in strata 5Z1-5Z4 from the winter RV survey.

Yellowtail flounder

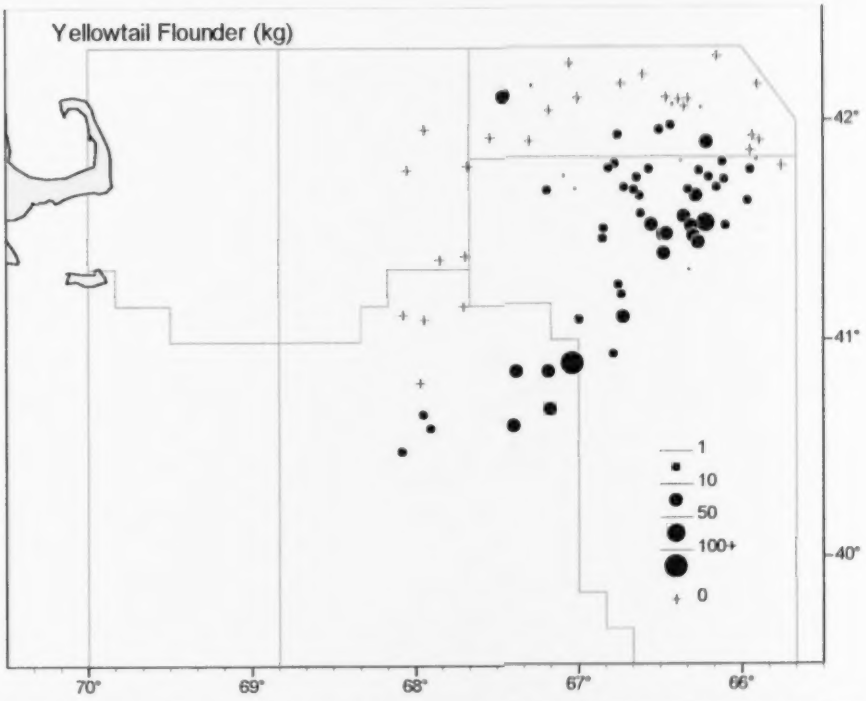

Figure 8a. Distribution and magnitude (weight/tow) of yellowtail flounder catches during the 2012 winter RV survey.

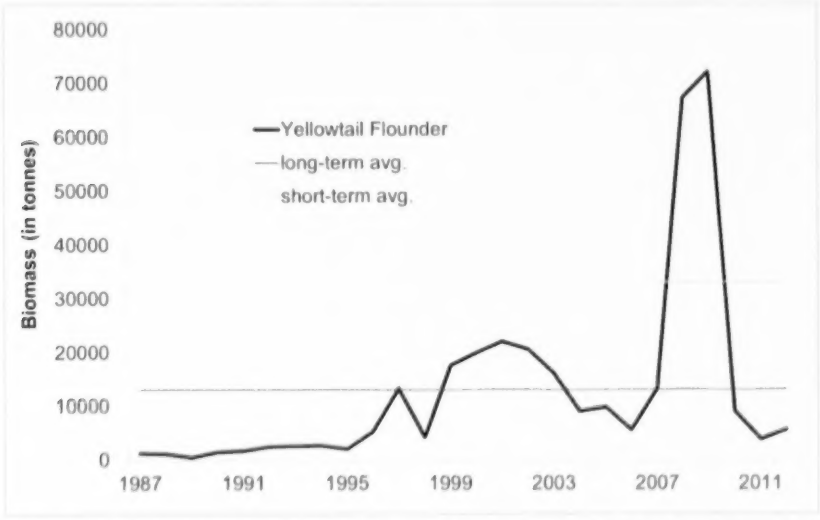

Figure 8b. Biomass indices for yellowtail flounder in strata 5Z1-5Z4 from the winter RV survey.

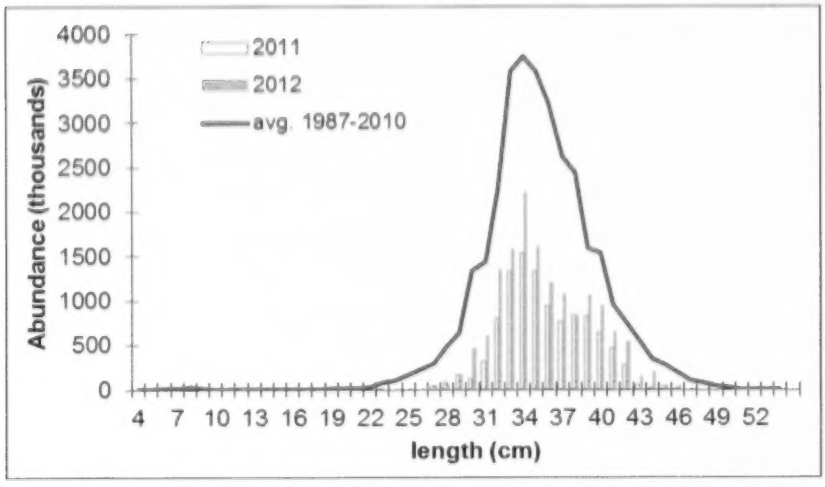

Figure 8c. Length composition for yellowtail flounder in strata 5Z1-5Z4 from the winter RV survey.

Atlantic wolffish

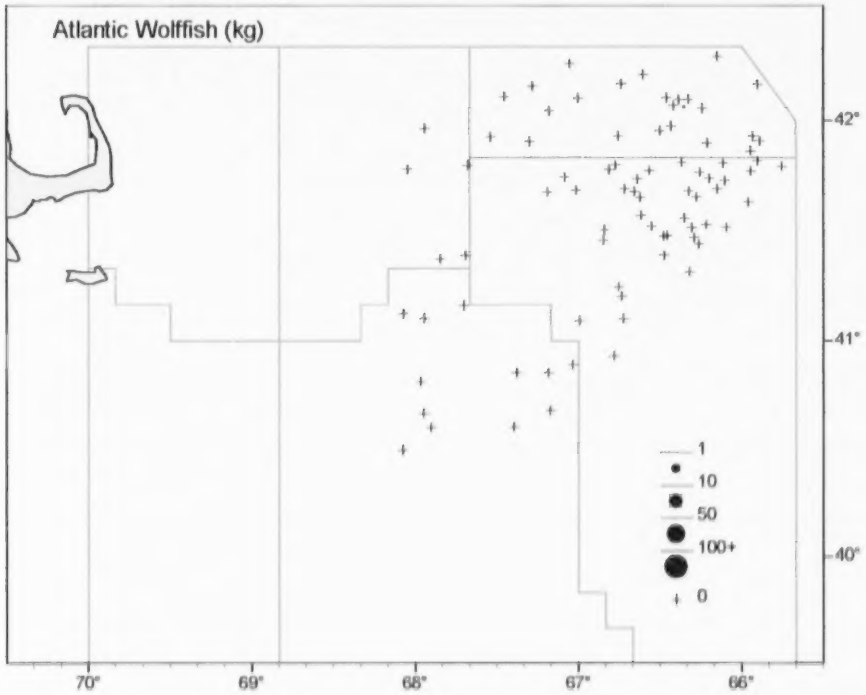

Figure 9a. Distribution and magnitude (weight/tow) of Atlantic wolffish catches during the 2012 winter RV survey.

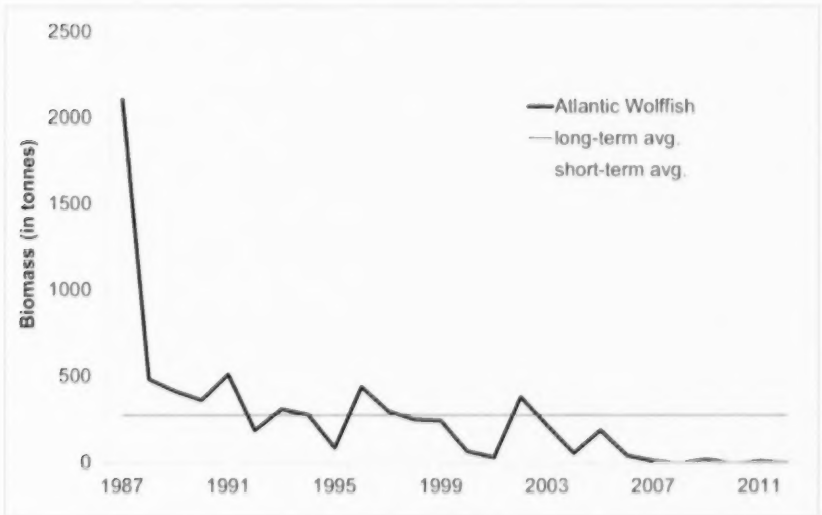

Figure 9b. Biomass indices for Atlantic wolffish in strata 5Z1-5Z4 from the winter RV survey.

Monkfish

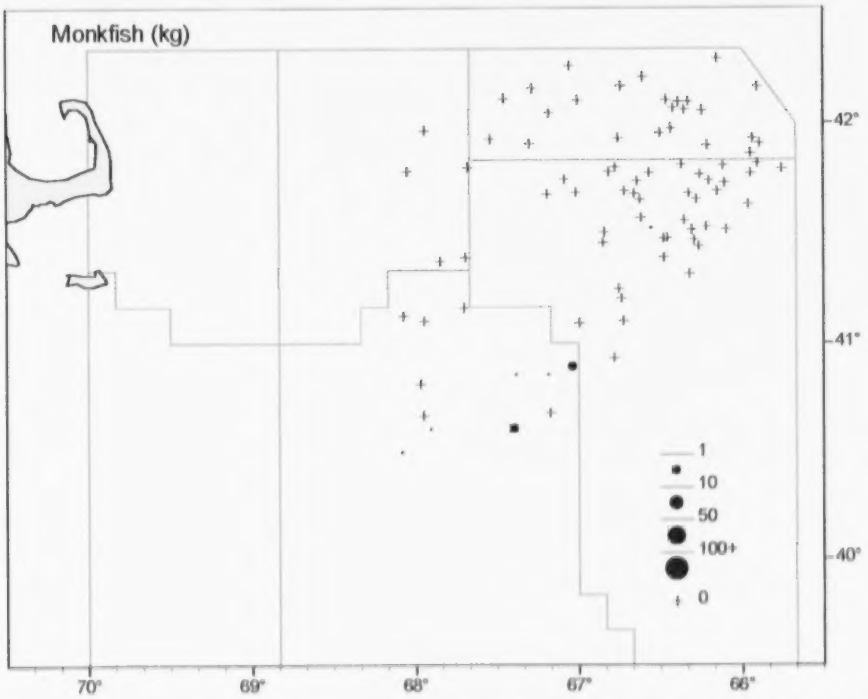

Figure 10a. Distribution and magnitude (weight/tow) of monkfish catches during the 2012 winter RV survey.

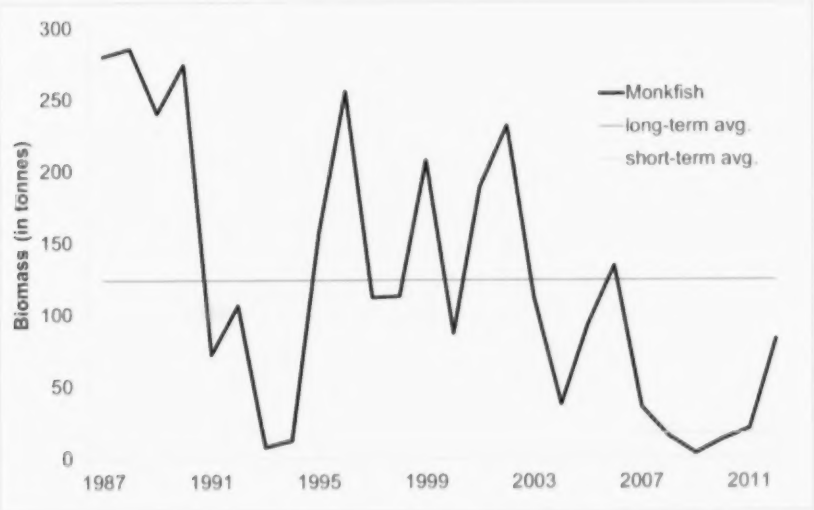

Figure 10b. Biomass indices for monkfish in strata 5Z1-5Z4 from the winter RV survey.

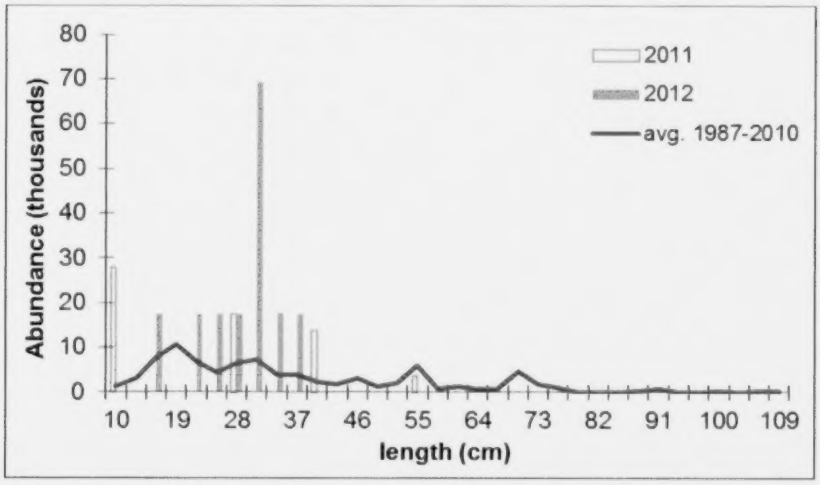

Figure 10c. Length composition for monkfish in strata 5Z1-5Z4 from the winter RV survey.

Smooth skate

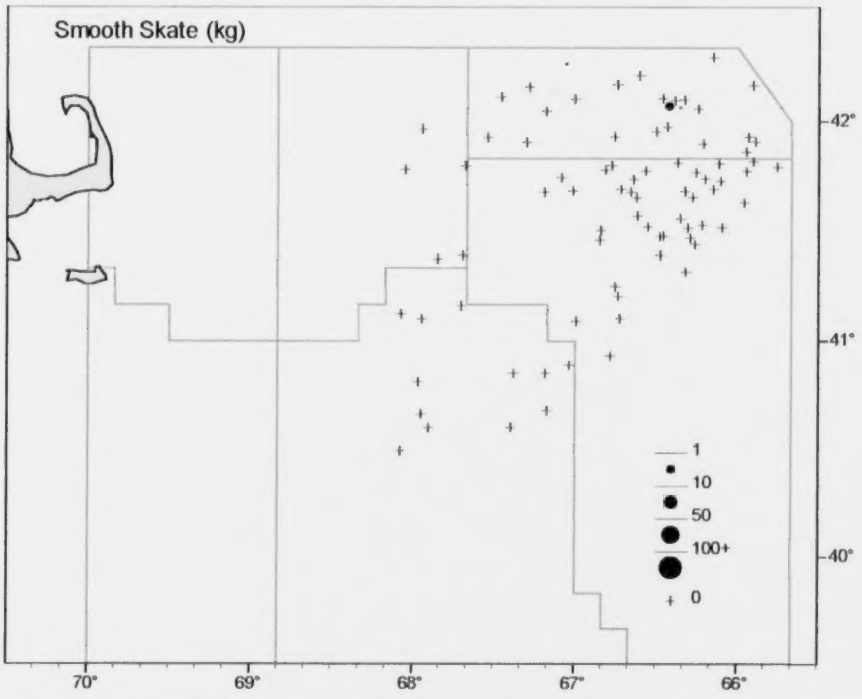

Figure 11a. Distribution and magnitude (weight/tow) of smooth skate catches during the 2012 winter RV survey.

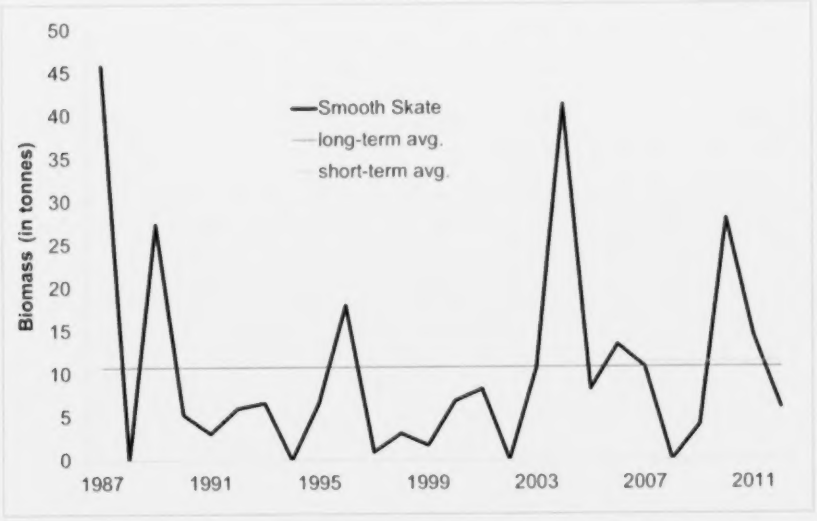

Figure 11b. Biomass indices for smooth skate in strata 5Z1-5Z4 from the winter RV survey.

Thorny skate

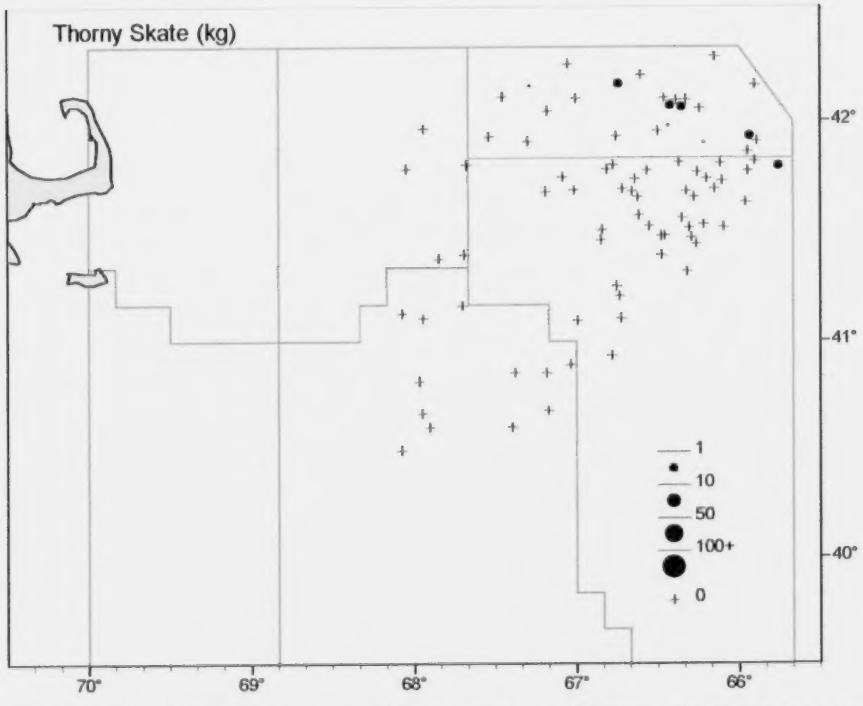

Figure 12a. Distribution and magnitude (weight/tow) of thorny skate catches during the 2012 winter RV survey.

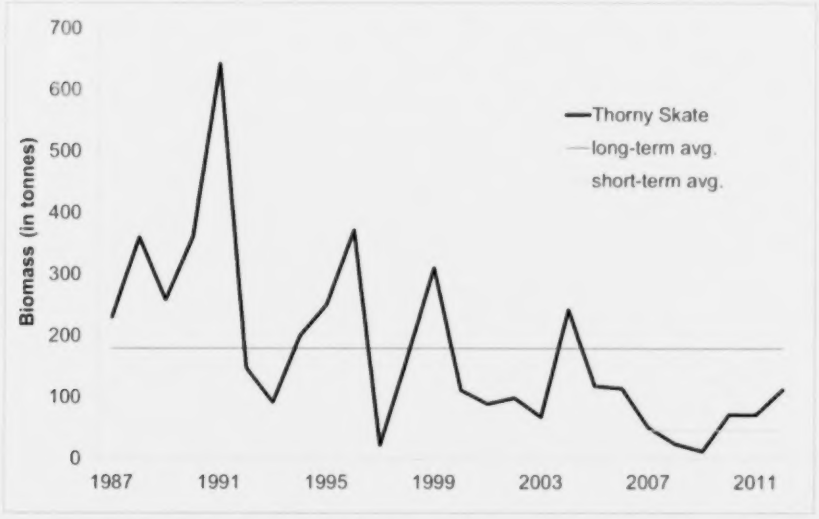

Figure 12b. Biomass indices for thorny skate in strata 5Z1-5Z4 from the winter RV survey.

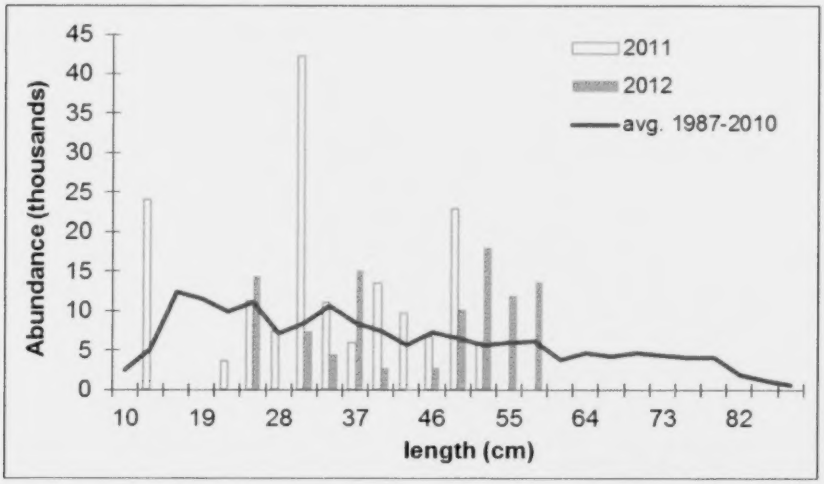

Figure 12c. Length composition for thorny skate in strata 5Z1-5Z4 from the winter RV survey.

Barndoor skate

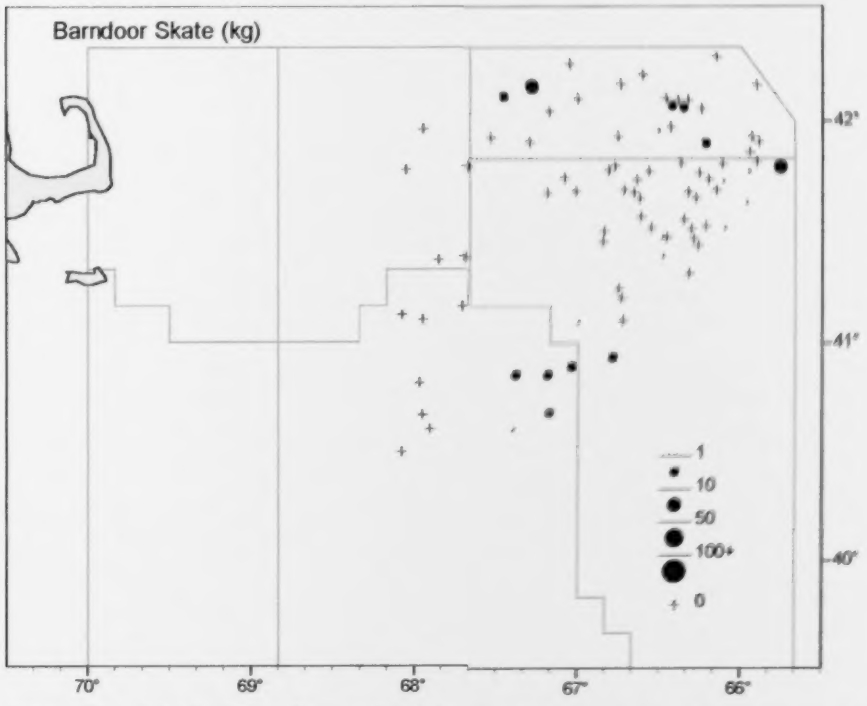

Figure 13a. Distribution and magnitude (weight/tow) of barndoor skate catches during the 2012 winter RV survey.

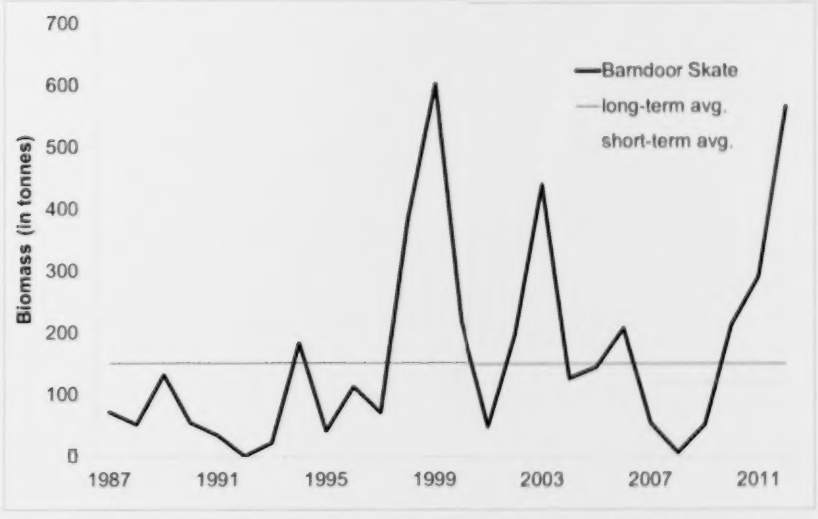

Figure 13b. Biomass indices for barndoor skate in strata 5Z1-5Z4 from the winter RV survey.

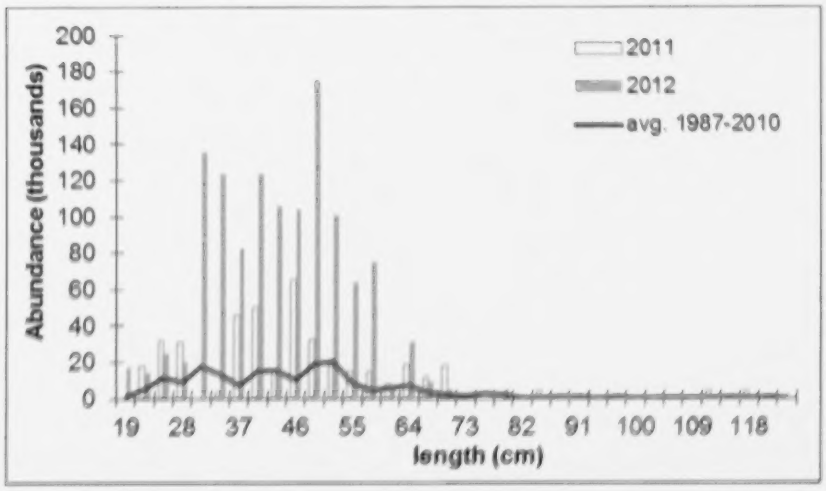

Figure 13c. Length composition for barndoor skate in strata 5Z1-5Z4 from the winter RV survey.

Winter skate and **little skate** cannot be reliably distinguished at lengths less than about 35 cm. Given that the majority of the winter and little skates captured in the surveys are in this length range, the biomass trends are influenced by the contribution of fish for which identification is uncertain (for more information see McEachran and Musick, 1973).

Winter skate

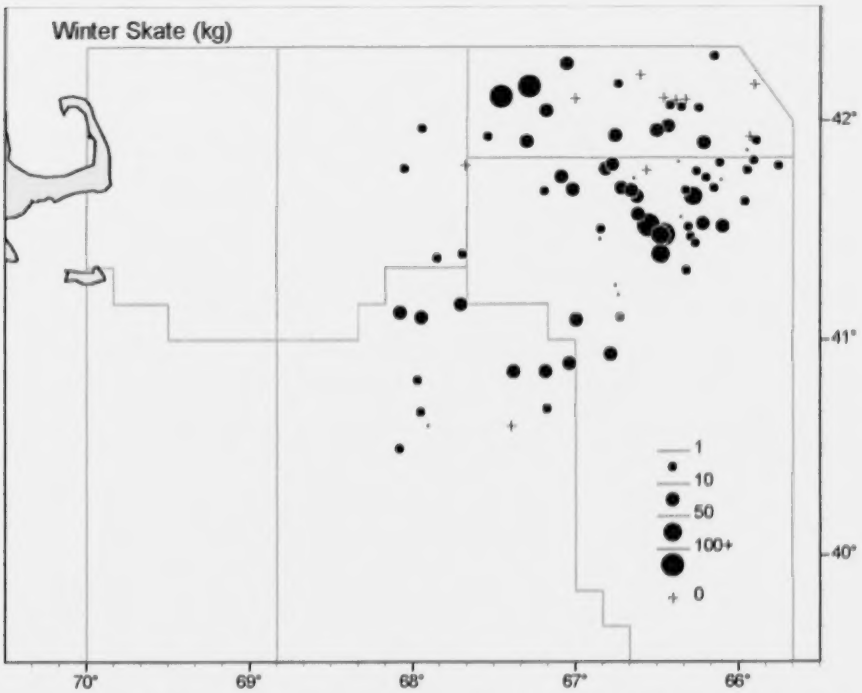

Figure 14a. Distribution and magnitude (weight/tow) of winter skate catches during the 2012 winter RV survey.

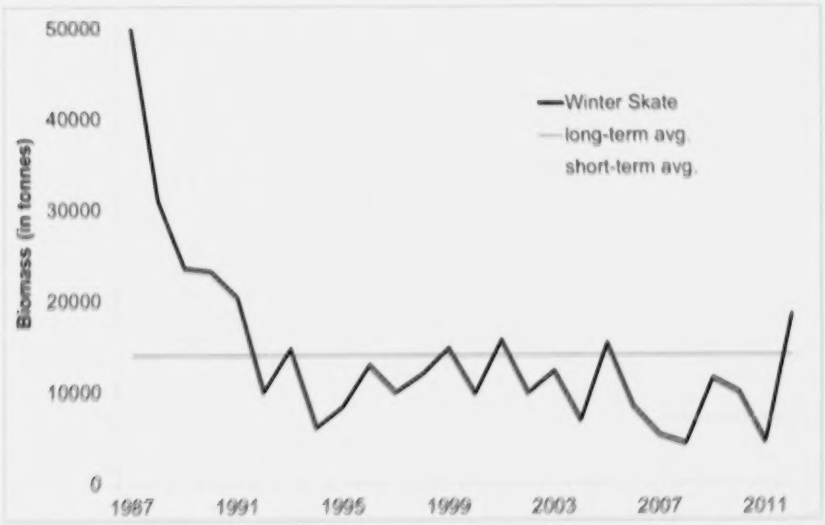

Figure 14b. Biomass indices for winter skate in strata 5Z1-5Z4 from the winter RV survey.

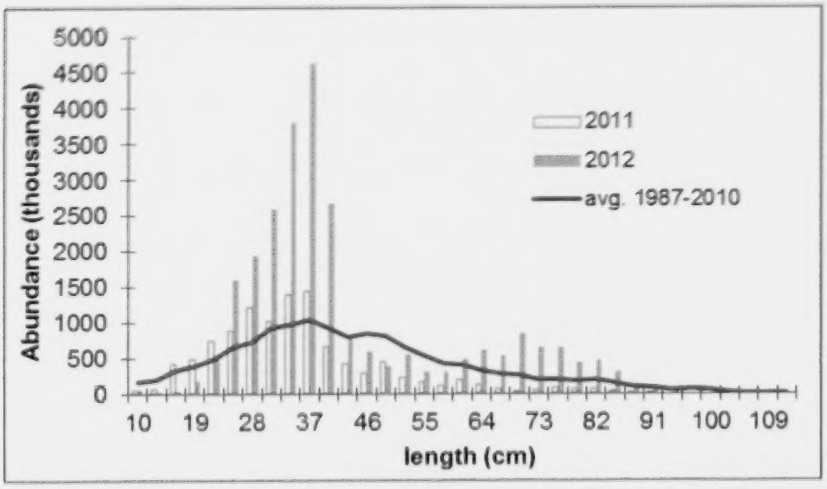

Figure 14c. Length composition for winter skate in strata 5Z1-5Z4 from the winter RV survey.

Little skate

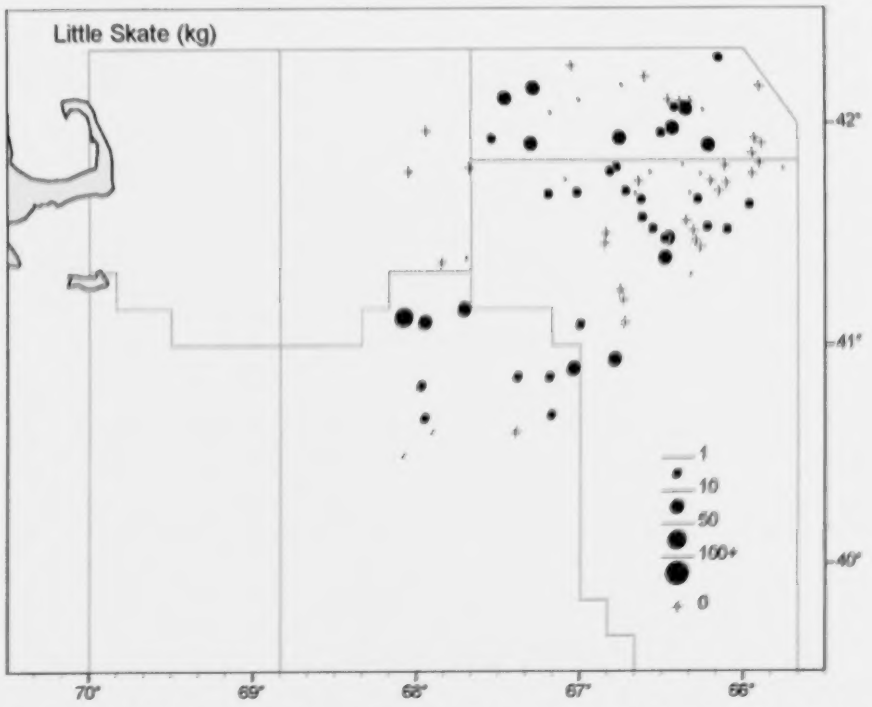

Figure 15a. Distribution and magnitude (weight/tow) of little skate catches during the 2012 winter RV survey.

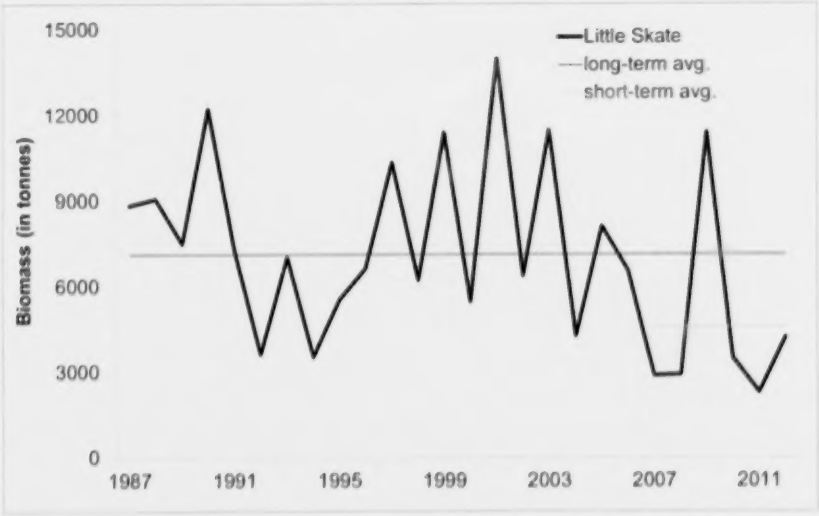

Figure 15b. Biomass indices for little skate in strata 5Z1-5Z4 from the winter RV survey.

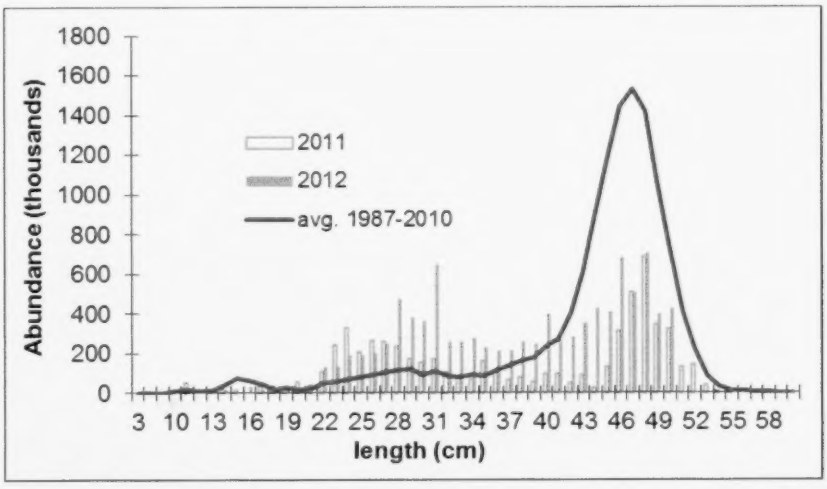

Figure 15c. Length composition for little skate in strata 5Z1-5Z4 from the winter RV survey.

Longhorn sculpin

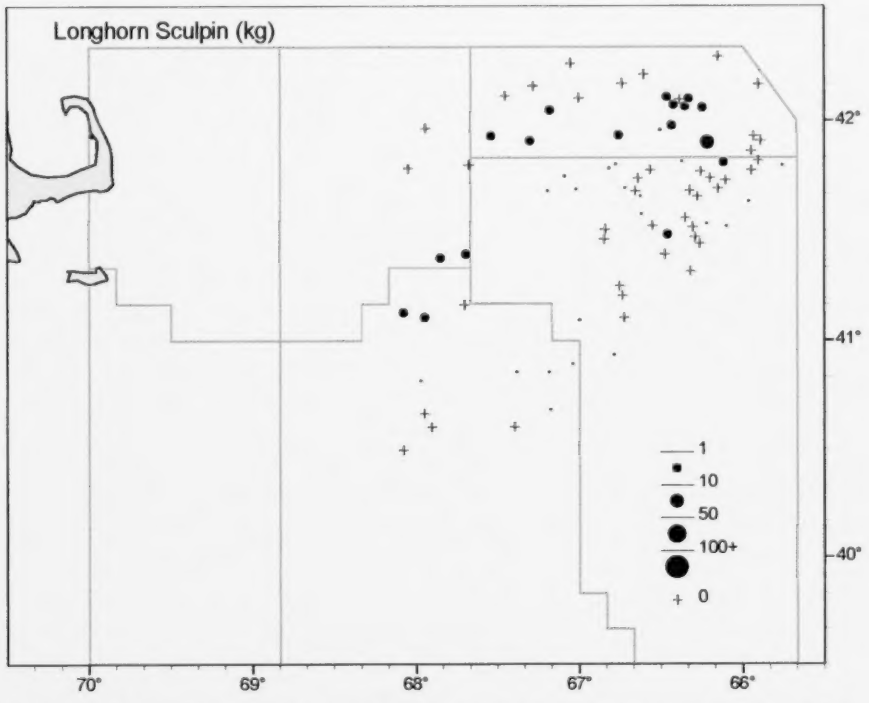

Figure 16a. Distribution and magnitude (weight/tow) of longhorn sculpin catches during the 2012 winter RV survey.

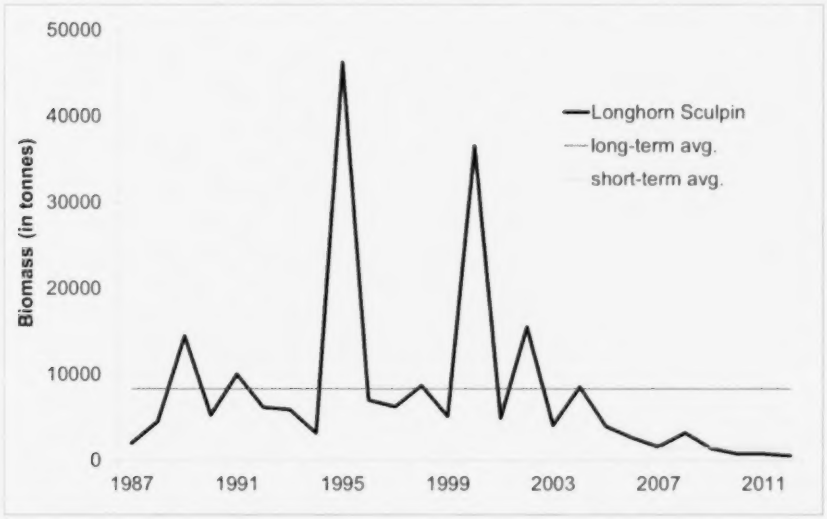

Figure 16b. Biomass indices for longhorn sculpin in strata 5Z1-5Z4 from the winter RV survey.

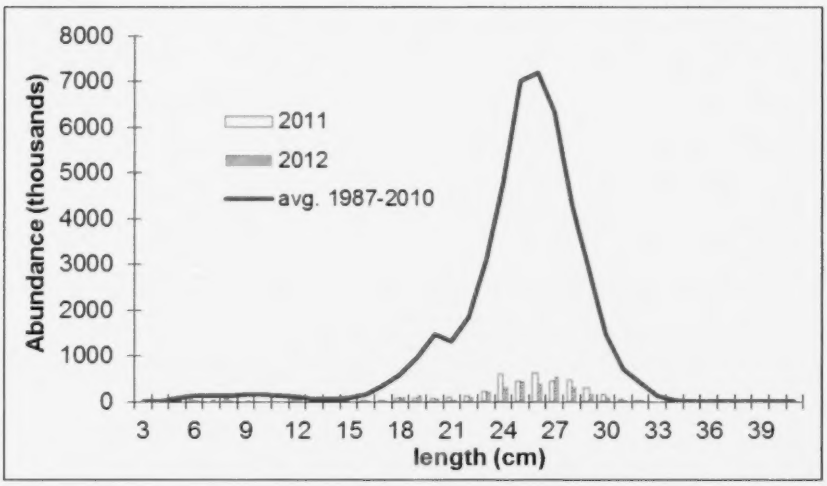

Figure 16c. Length composition for longhorn sculpin in strata 5Z1-5Z4 from the winter RV survey.

Conclusions

Biomass indices from the winter RV survey were compared with short-term (2007-2011) and long-term (1987-2011) averages. Length frequencies for 2011 and 2012 were compared to long-term averages (1987-2010).

Contributors

Donald Clark	DFO Maritimes Science, St. Andrews Biological Station
Peter Comeau	DFO Maritimes Science, Bedford Institute of Oceanography
Adam Cook	DFO Maritimes Science, Bedford Institute of Oceanography
Verna Docherty	DFO Maritimes Resource Management, Marine House
Jamie Emberley	DFO Maritimes Science, St. Andrews Biological Station
Mark Fowler	DFO Maritimes Science, Bedford Institute of Oceanography
Peter Hurley	DFO Maritimes Science, Bedford Institute of Oceanography
Jim Simon	DFO Maritimes Science, Bedford Institute of Oceanography
Heath Stone	DFO Maritimes Science, St. Andrews Biological Station
Daphne Themelis	DFO Maritimes Science, Bedford Institute of Oceanography
Jerry Young	DFO Maritimes Science, Bedford Institute of Oceanography
Tana Worcester	DFO Maritimes Science, Bedford Institute of Oceanography

Approved by

Alain Vézina
Regional Director of Science, DFO Maritimes Region
Dartmouth, Nova Scotia

Ph. 902-426-3490
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Sources of Information

This Science Response Report results from the Science Special Response Process of October 24, 2012, on the Review of Maritimes Research Vessel Survey Trends. Additional publications from this process will be posted as they become available on the Fisheries and Oceans Canada Science Advisory Schedule at www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm.

McEachran, J.D. and J.A. Musick. 1973. Characters for distinguishing between immature specimens of the sibling species, *Raja erinacea* and *Raja ocellata* (Pisces: Rajidae). Copeia 1973: 238-250.

Stone, H.H. and Gross, W.E. 2012. Review of the Georges Bank Research Vessel Survey Program, 1987-2011. Can. Manuscr. Rep. Fish. Aquat. Sci. 2988: xiii + 95p.

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Maritimes Region
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PO Box 1006, Station B203
Dartmouth, Nova Scotia Canada B2Y 4A2

Telephone: 902-426-7070
E-Mail: XMARMRAP@mar.dfo-mpo.gc.ca
Internet address: www.dfo-mpo.gc.ca/csas-sccs/

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